

# A new species of *Spinarge* Wei (Hymenoptera: Argidae) from China with a key to Chinese species

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**Abstract:** *Spinarge lishui* Liu, Li & Wei **sp. nov.** is described and illustrated from Jiulong National Wetland Park in Lishui City, Zhejiang Province, China. A key to the species groups and the seven Chinese species of *Spinarge* is given.

**Key words:** Arginae; taxonomy; sawfly

## 中国刺背三节叶蜂属一新种暨分种检索表（膜翅目：三节叶蜂科）

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**摘要：**记述中国浙江丽水市九龙国家湿地公园分布的刺背三节叶蜂属 1 新种：丽水刺背三节叶蜂 *Spinarge lishui* Liu, Li & Wei **sp. nov.**。给出了刺背三节叶蜂属世界分种团和中国种类检索表。

**关键词：**三节叶蜂亚科；分类；叶蜂

## Introduction

*Spinarge* Wei, 1998 is a small genus in the family Argidae which occurs in Asia and Europe but mainly from the eastern Asian region. Wei (1998) described this genus based on two new species from China and placed the genus within Athermatinae. Later, Wei & Nie (1998) added a third new species in this genus from China. Hara & Shinohara (2006) redefined the genus and placed this genus into the Arginae, described five additional new species from eastern Asia and transferred three *Arge* species into this genus, resulting in a total 11 species recorded worldwide (Hara & Shinohara 2006). In China, there are six recorded species at present (Wei 1998; Wei & Nie 1998; Hara & Shinohara 2006). Shinohara & Hara (2012) reported that *Tilia japonica* is the host plant of *Spinarge nigricornis*.

The males of *Spinarge* are very easy to recognize by their fifth abdominal tergum with a long and sharp middle spur. But the females of the genus are difficult to distinguish from the species of *Arge* although the longitudinal fine middle carina in the abdominal terga may be

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helpful for recognizing them. The validity of this genus needs further study on the generic phylogeny of Arginae. Here we follow the definition of *Spinarge* Wei by Hara & Shinohara (2006).

As a result of many collecting trips conducted within March and April from 2014 to 2018 at Jiulong National Wetland Park in Lishui City, Zhejiang Province, China, we obtained a new species of *Spinarge*. This species is described herein.

## Material and methods

All specimens of this newly described species were obtained by sweeping in wooded bogs and forest fringe zones in Zhejiang Province (East China) from 2014 to 2018. A new species with 485 specimens were examined and studied for this work. These specimens were examined with a Motic-SMZ-171 stereomicroscope. Images of the imagines were taken with a Nikon D700 digital camera and a Leica Z16APO. The genitalia were examined with a Motic BA410E microscope and photographed with a Motic Moticam Pro 285A. Images were focus-stacked using Helicon Focus (HeliconSoft, Kharkiv, Ukraine) and further processed with Adobe Photoshop CS 11.0.

The terminology of genitalia follows Ross (1945) and that for general morphology follows Viitasaari (2002). For a few terms (e.g. middle fovea and lateral fovea), we follow Takeuchi (1952).

The holotype and some paratypes are deposited in the Asian Sawfly Museum, Nanchang, China (ASMN). Some paratypes of this new species are deposited in the Scientific Research and Management Center of East China Pharmaceutical Botanical Garden, Lishui, Zhejiang, China (formerly Lishui Academy of Forestry, LSAF).

Abbreviations. OOCL — the distance between a lateral ocellus and the occipital carina, or the hind margin of the head where this carina would be if it were developed (Benson 1954); OOL — the shortest distance between an eye and a lateral ocellus; POL — the shortest distance between the mesal margins of the two lateral ocelli.

## Taxonomy

### *Spinarge lishui* Liu, Li & Wei sp. nov. (Figs 1–17)

Female. Holotype (Fig. 1). Length 10–10.5 mm. Body and legs dark metallic blue, strongly shiny; antenna black, scape and pedicellum weakly shiny, flagellum hardly shiny. Wing infusate in basal 2/3 and hyaline in apical 1/3, with a faint smoky spot below stigma, stigma and veins black. Body hairs black.

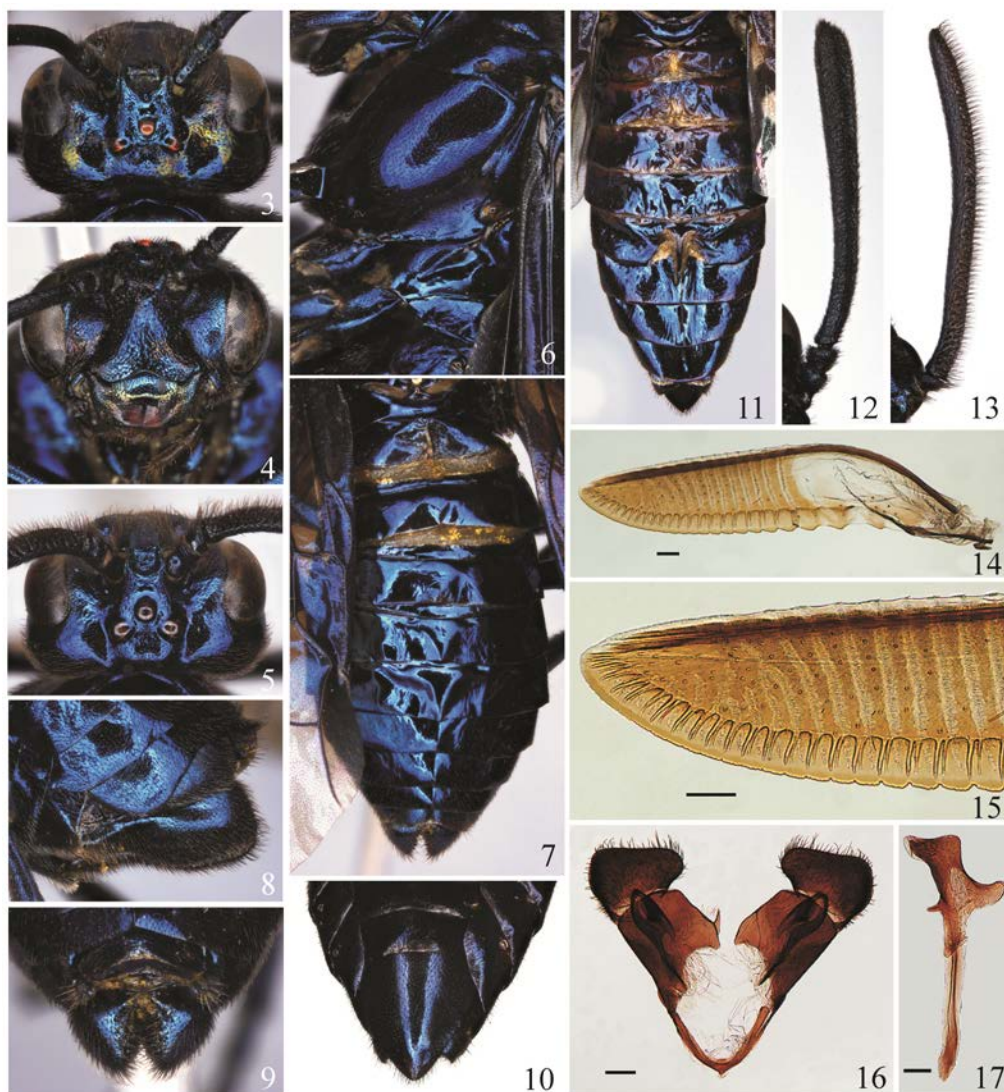
Face, front and head minutely punctured (Figs 3, 4), punctures on clypeus and supraclypeal area larger, mesopleuron and metapleuron with some minute punctures (Fig. 6), body otherwise impunctate (Figs 8, 11), strongly shiny.

Anterior margin of clypeus roundly emarginate (Fig. 4), malar space 1.2 times diameter of median ocellus (Fig. 4); supraclypeal area roundly raised, without middle longitudinal carina, upper part with a large fovea bounded by low lateral ridges, middle fovea narrowly and very shallowly connected with small frontal basin; postocellar area weakly elevated, 2.0 times

as broad as long (57 : 29), postocellar furrow broad and roundly bent forwards, lateral furrows shallow and slightly divergent backward, POL : OOL : OOCL = 5 : 6 : 5 (Fig. 3). Head weakly widened behind eyes, upper orbit shorter than eye in dorsal view (9 : 11), postorbit convex (Fig. 3). Antenna approximately 1.4 times length of head width, pedicellum broader than long, flagellum weakly bent in basal third and distinctly enlarged toward apex (Fig. 12). Mesoscutellum with a short middle furrow, mesopleuron and metapleuron as shown in Fig. 6. Front wing with vein R+M punctiform, cell 2Rs as long as 1Rs, vein 2r-m curved outward at middle, fourth abscissa of vein Rs as long as third abscissa of Rs, upper and lower margins of cell 2Rs equal in length; anal cell in hind wing approximately 2.0 times as long as petiole of anal cell (Fig. 1). Legs short, hind basitarsus as long as following 3 tarsomeres together; middle tibia with a preapical spur; hind tibia without preapical spur. Abdominal terga in dorsal view as shown in Fig. 7. Ovipositor sheath in lateral view quite short, distinctly concave in basal fourth and roundish at apex (Fig. 8); in dorsal view each lobe of apical sheath convex and as long as basal breadth, apex narrowly round with dense spines (Fig. 9). Lancet narrow with basal serrulae weakly elevated, middle and apical serrulae flat, annular spines short (Fig. 14), apical half of lancet as shown in Fig. 15.



Figures 1, 2. *Spinarge lishui* sp. nov., ♀, holotype. 1. Female adult, dorsal view; 2. Male adult, dorsal view. Scale bars = 2 mm.



Figures 3–17. *Spinarge lishui* sp. nov., ♀, holotype. 3. Head of female, dorsal view; 4. Head of female, anterior view; 5. Head of male, dorsal view; 6. Mesopleuron and metapleuron of female; 7. Abdominal terga of female, dorsal view; 8. Ovipositor sheath, lateral view; 9. Ovipositor sheath, dorsal view; 10. Subgenital plate, ventral view; 11. Abdominal terga of male, dorsal view; 12. Antenna of female, lateral view; 13. Antenna of male, lateral view; 14. Lancet; 15. Apical half of lancet; 16. Gonoforceps; 17. Penis valve. Scale bars = 200  $\mu$ m (Fig. 16); 100  $\mu$ m (Figs 14, 15, 17).

Male. Body length 7.5–8.5 mm (Fig. 2). Color and structure similar to female except for following characters: upper orbit of head clearly shorter than eye in dorsal view (Fig. 10), middle third of postocellar furrow straight, lateral two thirds strongly divergent backward (Fig. 5); upper margin of middle fovea closed and not connected with frontal basin; antenna approximately 1.7 times length of head width, flagellum with dense and erect hairs which are about 0.6 times breadth of flagellum (Fig. 13); mesoscutellum without middle furrow;

abdominal terga as in Fig. 11, apex of middle spur of tergum 5 reaching to basal 0.4 of tergum 6; subgenital plate in ventral view as shown in Fig. 10, apex distinctly narrowed; gonoforceps as shown in Fig. 16, harpe much broader than long; valviceps of penis valve narrow, ventral apical process broad and about as long as broad, dorsal apical corner subquadrate, not extending outward (Fig. 17).



Figure 18. Mating of *Spinarge lishui* sp. nov. at Jiulong National Wetland Park in Lishui City, Zhejiang Province, China (photoed by Dr. Zejian LI).

**Holotype.** ♀, **China**, Zhejiang, Lishui City, Bihu Town, Xinting Village, N. 28.41°, E. 119.83°, alt. 105 m, 04-IV-2014, Zejian LI, KCN (LSAF14004). **Paratypes.** 3♂, the same data as holotype; 2♂, **China**, Zhejiang, Lishui City, Bihu Town, Xinting Village, N. 28.41°, E. 119.83°, alt. 105 m, 29-III-2014, Zejian LI, KCN (LSAF14002); 1♂, **China**, Zhejiang, Lishui City, Bihu Town, Xinting Village, N. 28.41°, E. 119.83°, alt. 105 m, 19-IV-2014, Zejian LI, KCN (LSAF14014); 31♂, **China**, Zhejiang, Lishui City, Bihu Town, Xinting Village, N. 28.41°, E. 119.83°, alt. 105 m, 22-III-2015, Zejian LI, KCN (LSAF15016); 30♀90♂, **China**, Zhejiang, Lishui City, Bihu Town, Xinting Village, N. 28.41°, E. 119.83°, alt. 105 m, 02-IV-2016, Zejian LI, alcohol (LSAF16011); 4♀55♂, **China**, Zhejiang, Lishui City, Jiulong Wetland, Xinting Village, N. 28.402°, E. 119.828°, alt. 50 m, 02-IV-2017, Kaiwen GAO & Tingting JI, ethyl acetate (LSAF17019); 4♀31♂, **China**, Zhejiang, Lishui City, Jiulong Wetland, Xinting Village, N. 28.402°, E. 119.828°, alt. 50 m, 03-IV-2017, Kaiwen GAO & Tingting JI, ethyl acetate (LSAF17020); 4♀37♂, **China**, Zhejiang, Lishui City, Jiulong Wetland, Xinting Village, N. 28.402°, E. 119.828°, alt. 50 m, 03-IV-2017, Zejian LI &

Mengmeng LIU, ethyl acetate (LSAF17021); 9♀104♂, **China**, Zhejiang, Lishui City, Jiulong Wetland, Xinting Village, N. 28.402°, E. 119.828°, alt. 50 m, 04-IV-2017, Zejian LI & Mengmeng LIU, ethyl acetate (LSAF17022); 12♀65♂, **China**, Zhejiang, Lishui City, Jiulong Wetland, Xinting Village, N. 28.402°, E. 119.828°, alt. 50 m, 04-IV-2017, Kaiwen GAO & Tingting JI, ethyl acetate (LSAF17023); 2♀3♂, **China**, Zhejiang, Lishui City, Jiulong Wetland, Xinting Village, N. 28.402°, E. 119.828°, alt. 50 m, 22-III-2018, Zejian LI & Mengmeng LIU & Kaiwen GAO & Tingting JI, ethyl acetate (LSAF18003); 3♀2♂, **China**, Zhejiang, Lishui City, Jiulong Wetland, Xinting Village, N. 28.402°, E. 119.828°, alt. 50 m, 31-III–01-IV-2017, Zejian LI, ethyl acetate (LSAF17023).

Etymology. The specific epithet “*lishui*” is derived from Lishui City of Zhejiang Province, where the type specimens were collected.

Host plant. Unknown.

Remarks. This new species is close to *S. liui* Wei, 1998 in general appearance. See the key below for the differences between the two species.

### Key to species groups of *Spinarge* worldwide and to the Chinese species

1. Wings yellow, stigma and veins yellow brown. (Antenna and legs entirely black, body hairs black; hind tibia with preapical spur; harpe broader than long; valviceps of penis valve Z-like, ventral apical process distinct.) China, 1 species. *S. chrysoptera* group ..... *S. chrysoptera* (Gussakovskij)
- . Wings hyaline or largely infusate, stigma and veins largely black or dark brown ..... 2
2. Hind tibia without preapical spur; hairs on mesepisternum black. (Harpe clearly broader than long; valviceps of penis valve Z-like, ventral apical process distinct; wings distinctly infusate at basal 2/3 and hyaline at apical 1/3.) China, 3 species. *S. sichuanensis* group ..... 3
- . Hind tibia with a preapical spur; hairs on mesepisternum silver ..... 5
3. Body with faint metallic blue tinge; middle spur of tergum 5 very long, apex reaching to apical margin of tergum 6. (Valviceps of penis valve without dorsal apical process, ventral apical process long, about 2 times as long as broad). China (Sichuan) ..... *S. sichuanensis* Wei
- . Body with distinct metallic blue tinge; middle spur of tergum 5 short, apex reaching to basal 0.4–0.5 of tergum 6 ..... 4
4. Body with distinct purple tinge; valviceps of penis valve with a distinct dorsal apical process, ventral apical process narrow, about 2 times as long as broad. China (Hunan) ..... *S. liui* Wei
- . Body without distinct purple tinge; valviceps of penis valve without dorsal apical process, ventral apical process broad, about as long as broad. China (Zhejiang) ..... *S. lishui* Liu, Li & Wei **sp. nov.**
5. Cells C and Sc black brown, antenna and legs black without pale macula; harpe broader than long; valviceps of penis valve Z-like, ventral apical process long and narrow. Japan, 1 species ..... *S. nigricornis* group
- . Cells C and Sc hyaline, antenna and legs usually partly pale; harpe longer than broad; valviceps of penis valve broad, not Z-like, ventral apical process very short or absent ..... 6
6. Middle fovea between antennal toruli deeply and broadly connected with frontal basin, upper ends of lateral carinae between toruli not meeting; each lobe of apical sheath in dorsal view narrow, clearly longer than its breadth; male subgenital plate distinctly narrowed toward apex; hind tibia entirely or largely pale; spines on vein C yellow brown. Palearctic, 2 species. *S. metallica* group. (Antenna yellow brown, hind tibia entirely yellow white.) China (Hebei); Eastern Asia; Europe ..... *S. metallica* (Klug)
- . Middle fovea between antennal toruli very shallowly or not connected with frontal basin, upper ends of lateral carinae between toruli merging together or nearly so; each lobe of apical sheath in dorsal view broad, about as long as its breadth; male subgenital plate weakly narrowed toward apex; apex of hind tibia always

- black; spines on vein C blackish brown. Eastern Asia, 5 species. *S. fulvicornis* group ..... 7
7. Antennal flagellum and hind leg entirely black; ventral apical process of valviceps short but recognizable.  
China (Zhejiang) ..... *S. hyalina* Wei & Nie
- . Antennal flagellum reddish brown, hind tibia largely white; ventral apical process of valviceps indistinct.  
China (Jilin); Japan; Korea; Sakhalin ..... *S. fulvicornis* (Mocsáry)

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